



RECENT RESEARCH

IN THE BUILDING ENERGY ANALYSIS GROUP

AT THE LAWRENCE BERKELEY LABORATORY

Issued sporadically by the Building Energy Analysis Group in the Energy Analysis Program

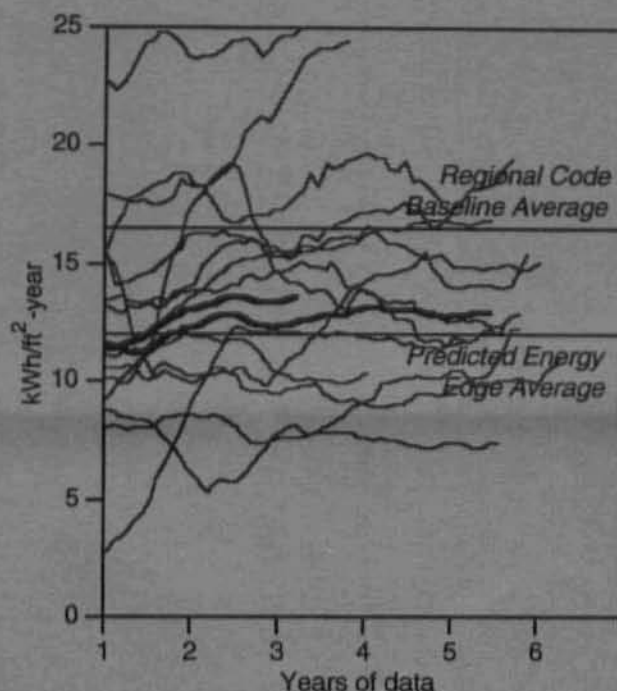
Early Energy Use in New Commercial Buildings

Many utilities base the success of energy-efficiency programs for new buildings upon the energy used in the buildings' first or second year of operation. Recent research from Bonneville Power Administration's Energy Edge Project shows that the early years of operation for new commercial buildings are not representative of long-term performance.

Energy Edge assessed the potential for electricity conservation in new commercial buildings. From 1986 to 1993, the project evaluated the performance of 28 buildings designed to be 30% more efficient than required by the regional energy code. Monthly utility bills were compiled to track energy use trends over a longer period of time than the expensive end-use metering covered. On average, energy use increased during the first four years of operation with the rate of growth slowing each year. The figure shows 12-month rolling averages of annual energy use (sum of the previous 12 months) for the 14 office buildings. Up to six years of data are shown. Energy savings for individual energy-efficiency measures were estimated using building simulation models calibrated by these data.

Buildings with the steepest growth in energy use during early years of operation are large office buildings, which can take several years to be fully occupied. One twenty-story office building required additional cooling after a large computer software company moved in during the building's third year of operation, increasing energy use by 20%.

Energy Edge has shown that evaluations of new commercial buildings cannot rely on first or second years of energy use to be representative of long-term trends. Further research on the persistence of energy savings is needed to evaluate



Energy use increases during early years of operation in new commercial buildings. Data are 12-month rolling averages from utility bills. Average energy use for all 14 office buildings for three years, and the subsample of 9 buildings for five years, are shown in thick, solid lines.

the performance of energy-efficiency measures over time.

For further information, contact Mary Ann Piette at (510) 486-6286 or send her e-mail at MAPiette@LBL.gov.

—Mary Ann Piette

Coming attractions: User frustration and manufacturer oversight: Why the Energy Star computers might not save as much energy as expected.

For further information about BEA, please contact Group Leader Alan Meier, Building 90-4000, Lawrence Berkeley Laboratory, Berkeley, CA 94720. Tel. (510) 486-4740 Fax (510) 486-6996 Internet AKMeier@LBL.gov

DOE-2 Resource Center In Portugal

The *Instituto de Tecnologia e Inovação Para a Modernização Empresarial (ITIME)* is the third and newest DOE-2 Resource Center. Located in Lisbon, ITIME is an RD&D private and non-profit association recently established within the scope of the Portuguese Ministry of Industry and Energy. ITIME is associated with the Institute for Engineering and Industrial Technology, the Portuguese Industrial Association, the Portuguese Design Centre, and other technological centers, engineering firms, and consultants. ITIME was established to network with engineering and consulting firms in order to accelerate technology transfer to the private sector. It also coordinates cooperative research efforts among companies and R&D institutions.

António Rego Teixeira is the primary contact for this resource center, which will primarily serve the south-European countries of Portugal, Spain, Italy and Greece. ITIME has a copy of the DOE-2.1E documentation and all back issues of the *User News*. They also have the newest LBL reports pertaining to DOE-2. Program users may contact Dr. Teixeira and arrange to get photocopies of the DOE-2 material for a nominal cost.

António Rego Teixeira
ITIME

Azinhaga dos Lameiros á Estrada do
Paço do Lumiar
1699 Lisboa Codex, PORTUGAL
Ph: 351 1-716-4096/Fx: 716-4305



*** * DOE-2 RESOURCE CENTERS * ***

The people listed here have agreed to be primary contacts for DOE-2 program users in their respective countries. Each resource center has the latest program documentation, all back issues of the User News, and recent LBL reports pertaining to DOE-2. In the future, these resource centers will receive copies of all new reports and documentation. Program users can then make arrangements to get photocopies of the new material for a nominal cost. We hope to establish resource centers in other countries; please contact us if you are interested in establishing a center in your area.

<p>South America Prof. Roberto Lamberts Universidade Federal de Santa Catarina Campus Universitario--Trindade Cx. Postal 476 88049 Florianopolis SC BRASIL Telephone: (55)482-31-9272 Fax: (55)482-34-1524 email: ECV1RLR@IBM.UFSC.BR</p>	<p>Australasia Dr. Deo K. Prasad/P. C. Thomas SOLARCH University of New South Wales P.O. Box 1 Kensington, N.S.W. 2033 AUSTRALIA Telephone: (61)-2-697-5783 (P.C. Thomas) Fax: (61) 2-662-4265 or -1378 email: PC.Thomas@unsw.EDU.AU</p>
<p>Portugal, Spain, Italy and Greece Antonio Rego Teixeira ITIME Azinhaga dos Lameiros a Estrada do Paco do Lumiar 1699 Lisboa Codex PORTUGAL Telephone: (351) 1-716-4096 Fax: (351) 1-716-4305</p>	

* * * * **DOE-2 DIRECTORY** * * * *

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Program Related Software and Services

Mainframe and Workstation Versions of DOE-2

<p>DOE-2.1D and 2.1E (Source code, executable code and documentation) For 2.1E DEC-VAX, Order #000158-DOVAX-02 For 2.1E SUN-4, Order #000158-SUN-0000 For 2.1D DEC-VAX, Order #000158-D6220-01 For a complete listing of the software available from ESTSC order their "Software Listing" catalog ESTSC-2.</p>	<p>Energy Science and Technology Software Center P.O. Box 1020 Oak Ridge, TN 37831-1020 Phone: (615) 576-2606 FAX: (615) 576-2865 Email: ESTSC@ADONIS.OSTI.GOV</p>
<p>FTI-DOEv2.1E (Source code and documentation) Combined source code package for both VAX and SUN versions of DOE-2.1E. Available on most distribution formats and for most operating systems (1/4" QIC tape, TK50 tape, 3.5" floppy, etc). Note: this is the distribution package only, no executables. Complete documentation for DOE-2.1E, digitally reproduced, spiral bound, and separated into multi-volume sets. [See <i>User News</i> Vol.12, No.4, p.16]</p>	<p>Finite Technologies, Inc 821 N Street, #102 Anchorage, AK 99501 Contact: Scott Henderson Phone: (907) 272-2714 FAX: (907) 274-5379 Email: 76530.1114@compuserve.com</p>

Microcomputer Versions of DOE-2

<p>ADM-DOE2 ADM-DOE2 (DOE-2.1E) is the most recent version of DOE-2.1E. This release is compiled for use on a 386 or 486 personal computer. It runs in a DOS or Windows environment and is a highly reliable and tested version of DOE-2. The package contains everything needed to run the program: program files, utilities, sample input files, and weather files. More than 300 weather files are available (TMY, TRY, WYEC, CTZ formats) for the U.S. and Canada. [See <i>User News</i> Vol.7, No.2, p.6]</p>	<p>ADM Associates, Inc. 3239 Ramos Circle Sacramento, CA 95827 Contact: Maria Sullivan, Sales Alex Lekov, Support Phone: (916) 363-8383 FAX: (916) 363-1788</p>
<p>CECDOEDC (Version 1.0A) A microcomputer version of DOE-2.1D integrated with a pre- and post-processing system designed strictly for compliance use within the State of California. It generates some of the standard compliance forms as output. Order P40091009 for the CECDOEDC Program with Manuals. Order P40091010 for the DOE-2.1 California Compliance Manual. [See <i>User News</i> Vol.12, No.4, p.13]</p>	<p>Publication Office California Energy Commission P.O. Box 944295 Sacramento, CA 94244-2950</p>

* *Caveat:* We list third-party DOE-2-related products and services for the convenience of DOE-2 users, with the understanding that the Simulation Research Group does not have the resources to check the DOE-2 program adaptations and utilities for accuracy or reliability.

Microcomputer Versions of DOE-2 (continued)

DOE-24/Comply-24

DOE-24 is a special DOE-2 release which is both a California-approved compliance program for the state's 1992 non-residential energy standards, and a stand-alone version of DOE-2.1E that includes a powerful yet easy-to-use input preprocessor. A demonstration program is available upon request.

[See *User News* Vol.12, No.2, p.2]

Gabel Dodd Associates
1818 Harmon Street
Berkeley, CA 94703-2416
Contact: Rosemary Howley
Phone: (510) 428-0803
FAX: (510) 428-0324

DOE-Plus™

DOE-Plus, a complete implementation of DOE-2.1D, is used to interactively input a building description, run DOE-2, and plot graphs of simulation results. Features include interactive error checking, context-sensitive help for all DOE-2 keywords, a 3-D view of the building that can be rotated, and several useful utilities.

[See *User News* Vol.11, No.4, p.4 and Vol.13, No.2, p.54]

ITEM Systems
1402 - 3rd Avenue, #901
Seattle, WA 98101
Contact: Steve Byrne
Phone: (206) 382-1440
FAX: (206) 382-1450

EZDOE

EZDOE is an easy-to-use PC version of DOE-2.1D. It provides full screen, "fill in the blank" data entry, dynamic error checking, context-sensitive help, mouse support, graphic reports, a 750-page user manual, extensive weather data, and comprehensive customer support. EZDOE integrates the full calculation modules of DOE-2 into a powerful, full implementation of DOE-2 on DOS-based 386 and 486 computers.

[See *User News* Vol.14, No.2, p.10 and No.4, p.8-14]

Elite Software, Inc.
P.O. Drawer 1194
Bryan, TX 77806
Contact: Bill Smith
Phone: (409) 846-2340
FAX: (409) 846-4367
Email: 76070,621@compuserve.com

FTI-DOEv2.1E

Highly optimized version of DOE-2.1E software, available for most computing systems. Current support: MSDOS and Windows 3.x, Windows NT, OS/2, RS/6000 (AIX), NeXT, SUN, UNIX (most systems). Call for platforms not listed. Documentation and weather files are available. Also FTI-DOEv2.1E source code, highly optimized and portable version; will compile for most systems.

[See *User News* Vol.12, No.4, p.16]

Finite Technologies, Inc.
821 N Street, #102
Anchorage, AK 99501
Contact: Scott Henderson
Phone: (907) 272-2714
FAX: (907) 274-5379
Email: 76530,1114@compuserve.com

MICRO-DOE2

MICRO-DOE2 (2.1E), which runs in a DOS or Windows environment, is a widely used, reliable, and tested PC version of DOE-2. The 2.1E version includes automatic weather processing, batch file creation, and a User's Guide with instructions on how to set up a RAM drive. System requirements: 386/486 PCs with 4 MB of RAM and math co-processor.

[See *User News* Vol.7, No.4, p.2, Vol.11, No.1, p.2 and Vol.15, No.1, p.8]

ERG/Acrosoft International, Inc.
1626 Cole Boulevard #250
Golden, CO 80401-3306
Contact: Gene Tsai, P.E.
Phone: (303) 233-4453
FAX: (303) 233-4234
Email: ergi@igc.apc.org

PRC-DOE2

A fast, robust and up-to-date PC version of DOE-2.1E. Runs in extended memory, is compatible with any VCPI compliant memory manager and includes its own disk caching. 377 weather data files available (TMY, TRY, WYEC, CTZ) for the U.S. and Canada

[See *User News* Vol.13, No.4, p.11 and Vol.15, No.1, p.5]

Partnership for Resource
Conservation
140 South 34th Street
Boulder, CO 80303
Contact: John Gehring or Paul Reeves
Phone or FAX: (303) 499-8611
Email: jgehring@aol.com

Microcomputer Versions of DOE-2 (continued)

VisualDOE for Windows™ VisualDOE, which uses DOE-2.1E as the calculation engine, enables architects and engineers to quickly evaluate the energy savings of HVAC and other building design options. Program is supported by context-sensitive on-line help. Program includes climate data for the 16 California weather zones. [See <i>User News</i> Vol.15, No.2, p.10]	Eley & Associates 142 Minna Street San Francisco, CA 94105 Contact: Charles Eley or John Kennedy Phone: (415) 957-1977 FAX: (415) 957-1381
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Pre- and Post-Processors for DOE-2

DOE123 Uses Lotus 1-2-3 to graphically display DOE-2.1D output as barcharts, pie charts, and line graphs. [See <i>User News</i> Vol.10, No.3, p.5]	Ernie Jessup 4977 Canoga Avenue Woodland Hills, CA 91364 Phone: (818) 884-3997
DrawBDL Graphic debugging and drawing tool for DOE-2 building geometry. DrawBDL reads your BDL input and makes a rotatable 3-D drawing of your building with walls, windows and building shades shown in different colors for easy identification. Runs on PC's under Microsoft Windows. [See <i>User News</i> Vol.14, No.1, p.5-7 and Vol.14, No.4, p.16-17]	Joe Huang & Associates 6720 Potrero Avenue El Cerrito CA 94530 Contact: Joe Huang Phone/FAX: (510) 236-9238
Graphs for DOE-2 2-D, 3-D, hourly, daily, and psychrometric plots [See <i>User News</i> Vol.13, No.1, p.5]	Energy Systems Laboratory Texas A&M University College Station, TX 77843-3123 Contact: Jeff Haberl Phone: (409) 845-6065 FAX: (409) 862-2762
PRC-TOOLS A set of PC programs that aids in extracting, analyzing and formatting hourly DOE-2 output. Determines energy use, demand, and cost for any number of end-uses and periods. Automatically creates 36-day load shapes. Custom programs also available. [See <i>User News</i> Vol.14, No.2, p.9]	Partnership for Resource Conservation 140 South 34th Street Boulder, CO 80303 Contact: Paul Reeves or John Gehring Phone or FAX: (303) 499-8611
Pre-DOE A math pre-processor for BDL.	Nick Luick 19030 State Street Corona, CA 91719 Phone: (714) 278-3131
Prep™ Prep is a batch preprocessor that enables conditional text substitution, expression evaluation, and spawning of other programs. Prep is ideal for large parametric studies that require dozens or even thousands of DOE-2 runs.	ITEM Systems 1402 - 3rd Avenue, #901 Seattle, WA 98101 Contact: Steve Byrne Phone: (206) 382-1440 FAX: (206) 382-1450

R E S O U R C E S

<p>User News Sent without charge to DOE-2 users, the newsletter prints documentation updates and changes, bug fixes, inside tips on using the program more effectively, and articles of special interest to program users.</p> <p>Regular features include a directory of program-related software and services and an order form for documentation. In the summer issue an alphabetical listing is printed of all commands and keywords in DOE-2, and where they are found in the documentation. The winter issue features an index of articles printed in all the back issues.</p>	<p>Simulation Research Group Bldg. 90, Room 3147 Lawrence Berkeley Laboratory Berkeley, CA 94720</p> <p>Contact: Kathy Ellington Phone: (510) 486-5711 FAX: (510) 486-4089 e-mail: kathy%gundog@lbl.gov</p>
<p>Help Desk - Bruce Birdsall Call or fax our DOE-2 expert, Bruce Birdsall, if you have a question about advanced modeling techniques. If you need to fax an example of your problem to Bruce, please be sure to telephone him prior to sending the fax. This service is supported by the Simulation Research Group.</p>	<p>Bruce Birdsall Ph/Fx: (510) 829-8459 Monday through Friday 10 a.m. to 3 p.m. Pacific Time</p>
<p>DOE-2 Training DOE-2 courses for beginning and advanced users.</p>	<p>Energy Simulation Specialists 64 East Broadway, Suite 230 Tempe, AZ 85282</p> <p>Contact: Marlin Addison Phone: (602) 967-5278</p>
<p>Instructional DOE-2 Video and Manual Takes you step-by-step in DOE-2.1D input preparation and output interpretation.</p>	<p>JCEM/U, Colorado Campus Box 428 Boulder, CO 80309-0428</p> <p>Contact: Prof. Jan Kreider Phone: (303) 492-3915</p>
<p>Weather Tapes</p> <p>TMY (Typical Meteorological Year) TRY (Test Reference Year)</p> <p>CTZ (California Thermal Climate Zones)</p> <p>WYEC (Weather Year for Energy Calculation)</p> <p>European Weather Files</p>	<p>National Climatic Data Center Federal Building Asheville, North Carolina 28801 (704) 259-0871 climate data (704) 259-0682 main number</p> <p>California Energy Commission Bruce Maeda, MS-25 1516-9th Street Sacramento, CA 95814-5512 1-800-772-3300 Energy Hotline</p> <p>ASHRAE 1791 Tullie Circle N.E. Atlanta, GA 30329 (404)636-8400 / Fax: (404)321-5478</p> <p>Andre Dewint Alpha Pi, s.a. rue de Livourne 103/12 B-1050 BRUXELLES Belgium Phone: 32-2-649-8359 FAX: 32-2-649-9437</p>

*** * DOE-2 ENERGY CONSULTANTS * ***

Consulting Engineers Charles Fountain Burns & McDonnell Engineers 8055 E. Tufts Avenue, Suite 330 Denver, CO 80237 (303) 721-9292	Consultant Greg Cunningham Cunningham + Associates 512 Second Street San Francisco, CA (415) 495-2220
Consultant Philip Wemhoff 1512 South McDuff Avenue Jacksonville, FL 32205 (904) 632-7393	Consultant Jeff Hirsch 12185 Presilla Road Camarillo, CA 93012 (805) 532-1045
Consultants Charles Eley, John Kennedy Eley Associates 142 Minna Street San Francisco, CA 94105 (415) 957-1977	Computer-Aided Mechanical Engineering Mike Roberts Roberts Engineering Co. 11946 Pennsylvania Kansas City, MO 64145 (816) 942-8121
Consultant Steven D. Gates, P.E. Building HVAC Design/Performance Modeling 11608 Sandy Bar Court Gold River, CA 95670 (916) 638-7540	Consultant Donald E. Croy CAER Engineers, Inc. 814 Eleventh Street Golden, CO 80401 (303) 279-8136
Mechanical Engineers Chuck Sherman Energy Simulation Specialists 64 East Broadway, Suite 230 Tempe, AZ 85282 (602) 967-5278	DSM and Energy Engineering Michael W. Harrison, P.E. Energy Resource Management, Inc. 305 West Mercury Butte, MT 59701 (406) 723-4061
Consulting Engineers Alan Cowan Criterion Engineers 5331 SW Macadam Ave., Suite 205 Portland, OR 97201 (503) 224-8606	Hourly Calibrated DOE-2 Analysis Jeff S. Haberl Energy Systems Laboratory Texas A&M University College Station, TX 77843-3123 (409) 845-6065
Consultant Martyn C. Dodd Gabel Dodd Associates 100 Galli Drive, Suite 1 Novato, CA 94949 (415) 883-5900	Consulting Engineers Prem N. Mehrotra General Energy Corporation 230 Madison Street Oak Park, IL (708) 386-6000
Energy Management Specialists Hank Jackson, P.E. P.O. Box 675 Weaverville, NC 28787-0675 (704) 658-0298	Consultant/Building Systems Analysis Robert H. Henninger, P.E. ElectroCom GARD Ltd. 7449 N. Natchez Avenue Niles, IL 60714 (708) 647-3252

* * DOE-2 ENERGY CONSULTANTS * *	
Consulting Engineers/Computer Simulation Sciences Robert E. Gibeault A-TEC 5515 River Avenue, Suite 301 Newport Beach, CA 92663 (714) 548-6836	Energy Consultants Gene Tsai ERG/Acrosoft International, Inc. 1626 Cole Boulevard, Suite 250 Golden, CO 80401 (303) 233-4453
Consulting Engineers Susan Reilly Enermodal Engineering 1554 Emerson Street Denver, CO 80218 (303) 861-2070	Technical Real World Analysis David J. Schwed Romero Management Associates 1805 West Avenue K, #202 Lancaster, CA 93534 (805) 940-0540
Energy Codes - DSM Doug Mahone The Heshong Mahone Group 4610 Paula Way Fair Oaks, CA 95628 (916) 962-7001	Consulting Engineers Gregory Banken, P.E. Q-Metrics, Inc. P.O. Box 3016 Woodinville, WA 98072 (205) 915-8590
Consultant/Building Systems Engineering Ellen Franconi 1504 Grant Street Berkeley, CA 94703 (510) 559-8340	Space Available
* DOE-2 ENERGY CONSULTANTS - INTERNATIONAL *	
Mainframe DOE-2 for European Users Joerg Tscherry EMPA, Section 175 8600 Dubendorf Switzerland	Space Available
Consultant Werner Gygli Informatik Energietechnik Weiherweg 19 CH-8604 Volketswil Switzerland	Consultant, Distributor for FTI-DOEv2.1E Andre Dewint rue de Livourne 103/12 B-1050 BRUXELLES Belgium

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DOE - 2 COMPUTER PROGRAM
DOCUMENTATION

Order Form

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Kinko's Copy Center
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for Kathy Ellington, LBL

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Announcing WINDOW 4.1

Windows & Daylighting Group (90-3111), Building Technologies Program, Energy & Environment Division,
Lawrence Berkeley Laboratory, Berkeley, CA 94720

Summary

WINDOW 4.0, LBL's PC computer program for analyzing window thermal performance, has been updated to version 4.1. This is an announcement which describes new features for those already familiar with version 4.0. If version 4.0 is meeting your needs and you are not a part of the NFRC process, you don't necessarily need to update now. However, if you share files with other users, you should be aware that version 4.1 output files cannot be read by version 4.0. Version 4.1 can read version 4.0 files. If you update to version 4.1, you will be able to use the program exactly as you would version 4.0.

No internal program calculations have changed in version 4.1 and no significant changes have been made to the screen format. Version 4.1 looks and acts very much the same as 4.0 except that more features are available to the user. Several changes have been made to assist NFRC calculations and reports. These enhancements make the program more functional for everyone.

Here is a list of features that have been added or enhanced in WINDOW 4.1.

- ♦ Enhanced editing functions
- ♦ Multiple range library printing functions
- ♦ Expanded copy function
- ♦ Enhanced program start up
- ♦ New "Custom" window type
- ♦ New NFRC report format
- ♦ U-value display precision toggle
- ♦ Comma or tab delimited output feature
- ♦ Improved FRAME 3 file support
- ♦ Improved library functions (Alt+L)

Note to DOE-2.1E users: you can use WINDOW 4.0 and 4.1 to add custom glazings to the DOE-2 window library.

Ordering

If you are a current WINDOW 4.0 user, you need only order the one-disk update package. You will still be able to access all your existing libraries with the new version. If you are not familiar with version 4.0, or do not have the documentation for version 4.0, you should order the WINDOW 4.1 Complete Package, with a fully updated manual (available March 1994). To order the free update, fax or mail this page to:

WINDOW 4.1 Update
90-3111
Lawrence Berkeley Laboratory
Berkeley, CA 94720
FAX 510-486-4089

Check the package you want:

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- ☐ WINDOW 4.1 Complete Package

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This work was supported by the Assistant Secretary for Conservation and Renewable Energy, Office of Building Technologies, Building Systems and Materials Division of the U.S. Department of Energy under Contract No. DE-AC03-76SF-00098.

DOE-2 Program Documentation		
Document	Order Number	Price
DOE-2 Basics Manual (2.1E)	DE-940-13165	*
BDL Summary (2.1E)	DE-940-11217	*
Sample Run Book (2.1E)	DE-940-11216	*
Reference Manual (2.1A)	LBL-8706, Rev.2	126.00
Supplement (2.1E)	DE-940-11218	*
Engineers Manual (2.1A) [algorithm descriptions]	DE-830-04575	52.00
* Prices haven't been assigned yet; call NTIS. For shipments to non-U.S. addresses, double the prices listed above.		
Order from:		
National Technical Information Service 5285 Port Royal Road Springfield, VA 22161	Phone (703) 487-4650 FAX (703) 321-8547	

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